

**US Army Corps  
of Engineers**

Galveston District

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**Brownsville, Texas  
Brazos Island Harbor Reconnaissance  
Report  
Section 905(b) Analysis**

**U.S. Army Engineer District, Galveston  
Southwestern Division  
September 2004**

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**1. STUDY AUTHORITY**

a. This Section 905(b) (WRDA 86) analysis is in response to a resolution of the House Committee on Public Works, 5 May 1966; followed by the Consolidated Appropriations Act, 2003 (PL 108-7), Section 113, (credit for wetlands restoration). That resolution reads as follows:

In satisfaction of any normal requirement for mitigation identified by the pending Environmental Impact Study for the deepening of the Brownsville Navigation Channel, Texas, the Secretary of the Army, acting through the Chief of Engineers, shall provide credit to the Brownsville Navigation District for work performed before the completion of the Environmental Impact Study to restore the wetlands at Bahia Grande, Lower Laguna Madre, and Vadia Ancha. Such credit shall be at a ratio determined by the Secretary, considering the environmental value of the wetlands impacted by the project and the environmental value of the restored wetlands. The Secretary shall provide credit for work only if the Secretary determines such work integral to the project.

b. Funds in the amount of \$100,000 were appropriated in fiscal year 2004 to conduct the reconnaissance phase of the study. In response to the study authority, the reconnaissance phase of the study was initiated on 24 February 2004.

**2. STUDY PURPOSE**

The purpose of this study is to determine if there is a Federal interest when considering widening and deepening the existing channel located in Brownsville, Texas, construction of ecosystem restoration features, and construction of storm damage reduction features. If Federal interest is determined, a feasibility report will be forwarded to Congress with a recommendation for authorization. The reconnaissance phase of the study has resulted in the finding that there is a Federal interest in continuing the study into the feasibility phase. The purpose of this Section 905(b) (WRDA 86) analysis is to document the basis for this finding and establish the scope of the feasibility phase. As the document that establishes the scope of the feasibility study, this Section 905(b) (WRDA 86) analysis is the basis of the Scope of Work chapter of the Project Management Plan (PMP).

### **3. LOCATION OF PROJECT/CONGRESSIONAL DISTRICTS**

a. The study area encompasses the entire Brazos Island Harbor and surrounding region. The entrance channel is located offshore of Cameron County, Texas, in the Gulf of Mexico and ends at the Port of Brownsville Main Harbor in the City of Brownsville. A map of the study area as detailed in the previous authorization is presented as Figure 1.

b. The non-Federal sponsor for the feasibility phase of the study is the Port of Brownsville.

c. The study area lies within the jurisdiction of the following Congressional Districts:

- US Senator John Cornyn (R)
- US Senator Kay Bailey Hutchison (R)
- US Representative, 27th District – Solomon P. Ortiz (D)

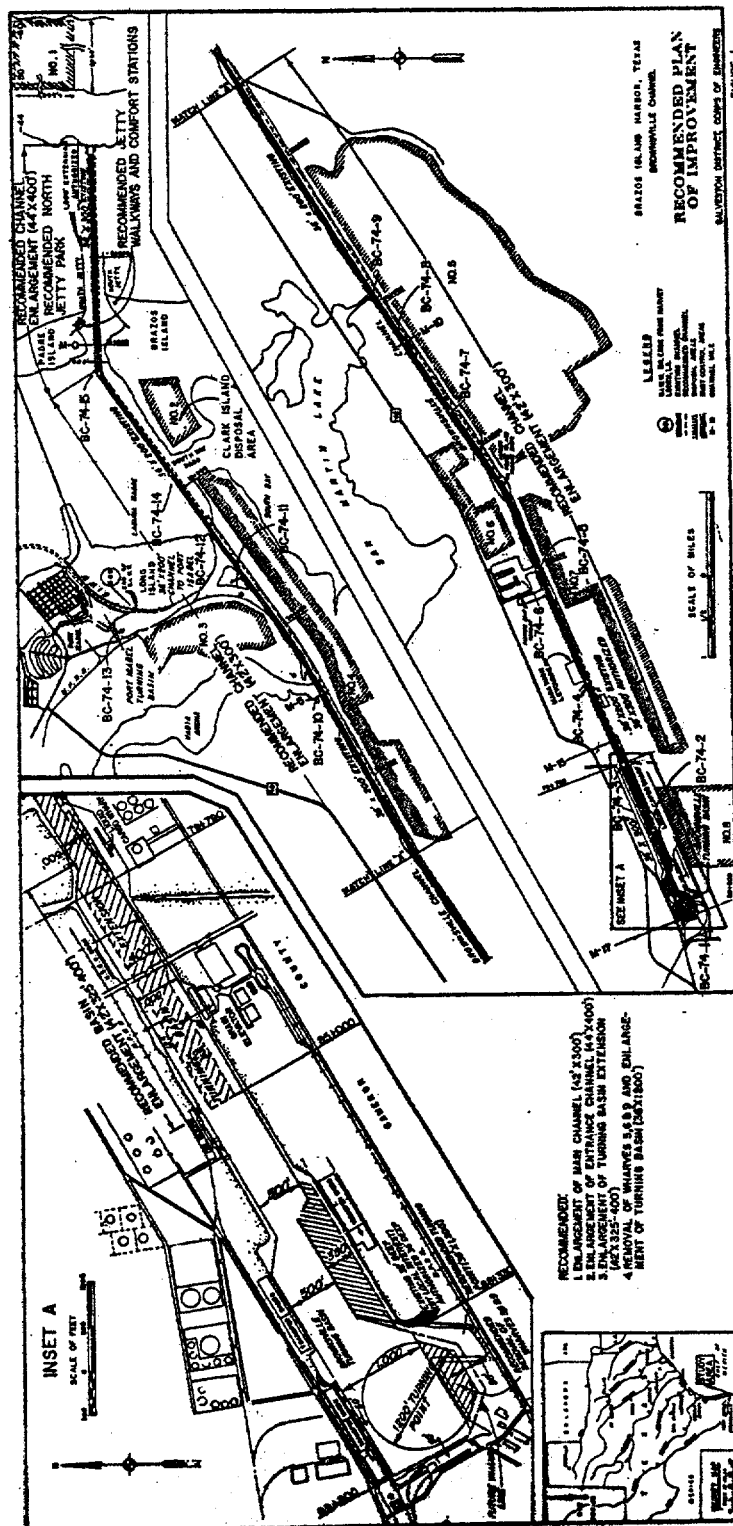
### **4. PRIOR STUDIES AND REPORTS**

The following studies were reviewed for this reconnaissance report. These reports provide information on previous Federal and local evaluation of water resource problems in the Rio Grande basin.

- Draft Environmental Statement, Brazos Island Harbor, Texas, Brownsville Channel, June 1977. Details proposed widening and deepening of the channel. Proposes deepening the 36-foot channel to 42 feet.

- Reevaluation Report for the authorized Brazos Island Harbor, Texas (42-foot Project), October 1988. This report details completion of a reevaluation of the authorized 42-foot project. The recommended plan detailed in the report includes enlarging the inland 14.8 miles of the channel to 42 feet in depth by 400 feet wide. The entrance channel was also to be enlarged to a depth of 44 feet and width of 400 feet. The plan also added an additional 240 acres of confined disposal areas and 795 acres of offshore disposal areas to accommodate construction and future maintenance requirements.

- Dredged Material Management Plan, Preliminary Project Assessment, Brazos Island Harbor, Texas, February 1997. This document evaluates placement capacity for the project for 20 years. The report states that sufficient capacity exists for the next 20 years. However, a better assessment needs



to be made of the shoaling rates to better forecast the capacity of certain placement areas beyond 20 years.

## 5. PLAN FORMULATION

During a study, the six planning steps that are set forth in the Water Resource Council's Principles and Guidelines are repeated to focus the planning effort and eventually to select and recommend a plan for authorization. The six planning steps are: 1) specify problems and opportunities, 2) inventory and forecast conditions, 3) formulate alternative plans, 4) evaluate effects of alternative plans, 5) compare alternative plans, and 6) select a recommended plan. The phases of the planning process typically differ in the emphasis that is placed on each of the steps. In the iterations conducted during the reconnaissance phase, the step of specifying problems and opportunities is emphasized, although the other steps are not ignored, since the initial screening of preliminary plans that results from the other steps is critical to the scoping of the follow-on feasibility phase studies. The sub-paragraph that follows presents the results of the reconnaissance phase. This information will be refined in future iterations of the planning steps during the feasibility phase.

a. **Identified problems.** This study responds to several concerns specific to widening and deepening of the channel. Several other opportunities were evaluated, including ecosystem restoration and shoreline erosion abatement.

(1) **Existing conditions.** The Port of Brownsville is the southernmost port in Texas and the western terminus of the Gulf Intracoastal Waterway System (GIWW). The Port, a man-made basin 4,200 feet long and varying width from 400 feet to 1,200 feet, is three miles north of the Rio Grande and the Mexican border, five miles east of the City of Brownsville and seven miles from the rail and highway border crossing. The Port is connected with the Gulf of Mexico by a 17-mile long ship channel. Entrance from the Gulf of Mexico is at Brazos-Santiago Pass.

Two rock jetties protect the Entrance Channel and are over 5,000 feet in length and 1,200 feet apart. The channel has no bridges or other obstructions for the entire length of the virtually straight waterway. Controlling depths in feet at mean low water are detailed 42 feet throughout, except in the Entrance Channel where the channel is 44 feet deep (Table 1).

The Main Harbor consists of the Turning Basin, Turning Basin Extension, and Turning Basin approach, containing almost five miles of improved frontage. The Turning Basin is 3,500 feet long, varies in width from 400 to 1,200 feet and contains nine cargo docks. Four oil docks and a bulk cargo dock serving a grain elevator and bulk plant, a liquid cargo dock and an express dock are

located in the Turning Basin Extension which is 5,400 feet long and has a 500-foot bottom width. The Turning Basin Approach is 15,600 feet long with a bottom width of 300 feet. Various private marina related businesses (e.g. ship repair and salvage yards) are located on both sides of the Turning Basin Approach.

**Table 1. Existing widths and depths of the Brownsville Ship Channel**

	<u>Authorized Bottom Width</u>	<u>Authorized Depth</u>
Entrance Channel	300	44
Entrance Channel to Turning Basin Extension		
Basin Extension	250-300	42
Turning Basin Extension	500	42
Turning Basin	1,200	36

As detailed by the facilities present, Brownsville is primarily a bulk commodity port covering both liquid and dry cargo handling. Principal imports and exports include chemicals, liquid petroleum gas, clays, petroleum, grain, agricultural products, sulfur, steel, bulk minerals, ores, fertilizers and aluminum. Brownsville is an important in-transit port for trade to and from Mexico and in 2002 was the nation's second largest in-transit harbor by volume.

Brownsville experienced generally strong growth over the past decade, increasing from 1.8 million tons in 1992 to 4.7 million tons in 2002 (76<sup>th</sup> in the nation in total volume). Waterborne commerce statistics for 1992-02, select years, are summarized in Table 2. Foreign imports, primarily in-transit cargo, have been the primary driver for growth, while domestic movements remained relatively flat. Foreign trade has more than doubled since 1998, from 1.4 million tons to 3.2 million tons in 2002. Of total foreign trade, 2.75 million tons were inbound. Of this inbound cargo, 2.0 million tons (73 percent) were in-transit to Mexico. The in-transit share for all foreign trade, inbound and outbound, was 67 percent in 2002, or 2.1 million tons. Iron ore, iron and steel products, and other metal ores and products dominate the inbound foreign cargo.

**TABLE 2. Brazos Island Harbor Waterborne Commerce**  
**1000's of short tons**

Year	Total Tonnage	<u>Foreign</u>		Coastwise	GIWW
		Imports	Exports		
1992	1,829	233	86	18	1,492
1998	2,829	1,357	41	71	1,360
2001	4,119	1,985	314	355	1,466
2002	4,741	2,751	409	170	1,411

Source: U. S. Waterborne Commerce of the U. S., Part 2, 1992-02.

In addition to traditional vessel traffic, information provided through the non-Federal sponsor documented the need for increased channel dimensions in order to serve offshore rigs presently operating in the U. S. Gulf Coast. The operational draft of the newer rigs ranges from 45 to 63 feet.

## **(2) Planning objectives and planning constraints.**

**(a) National Objectives.** The national or Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements.

- Contributions to National Economic Development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the nation.

- The Corps has added a second national objective for National Ecosystem Restoration (NER) in response to legislation and administration policy. This objective is to contribute to the nation's ecosystems through ecosystem restoration, with contributions measured by changes in the amounts and values of habitat.

**(b) Public Concerns.** A number of public concerns have been identified during the course of the reconnaissance study. Initial concerns were expressed in the study authorization. Additional input was received through coordination with the potential sponsors and initial coordination with other agencies. The public concerns that are related to the establishment of planning objectives and planning constraints are:

- (i) The detrimental impacts to existing habitat and possibility for enhancement of existing habitat. Several habitats previously subject to tidal inundation have been impacted such that no tidal flow is present. Public input suggests that the project should evaluate opportunities to return tidal flow to these areas.

- (ii) Reduction of dust impacts in the region. This concern relates back to the previous concern, and opportunities to reduce dust are tied to the return of tidal flows in large sandy areas.

**(c) Study Planning Objectives.** The national objectives of NED and NER are general statements and not specific enough for direct use in plan formulation. The water and related land resource problems and opportunities identified in this study are stated as specific planning

objectives to provide focus for the formulation of alternatives. These planning objectives reflect the problems and opportunities and represent desired positive changes in the without project conditions. The planning objectives are specified as follows:

(i) Identify opportunities to enhance navigability of the channel through the consideration of widening and deepening alternatives.

(ii) Identify opportunities for ecosystem restoration within the Bahia Grande and other similar habitats.

(iii) Identify opportunities for storm damage reduction in the coastal City of South Padre Island or adjacent areas.

(d) **Planning Constraints.** Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that should not be violated. The planning constraints identified in this study are as follows.

(i) Potential to damage high quality habitats present in the area including sea grasses and mangrove habitat.

(ii) Compliance with local land use plans and with all state requirements contained in the Texas Coastal Management Plan.

**(3) Problems Warranting Federal Participation.** Examples of some of the specific problem areas include, but are not limited to the following:

- Existing depths of the channel are restricting travel by certain vessel types.

- Several habitats have been cut off from tidal flow due to the construction of placement areas and roadways. This impacts quality of habitat and also creates health hazards through wind-induced dust storms from dry material in Bahia Grande and placement areas.

- The City of South Padre Island is a coastal community located on South Padre Island. As such, it is subject to potential wind and wave damage cause by tropical storms and hurricanes that enter or form in the Gulf of Mexico.

b. **Alternative plans.** A wide variety of measures were considered, some of which were found to be infeasible due to technical, economic, or environmental constraints. Each measure was



assessed and a determination made regarding whether it should be retained in the formulation of alternative plans. The descriptions and results of the evaluations of the measures considered in this study are presented below:

(1) **No Action.** The Corps is required to consider the option of “No Action” as one of the alternatives in order to comply with the requirements of the National Environmental Policy Act (NEPA). No Action is the condition reasonably expected to prevail over the period of analysis, given current conditions and trends, and assuming that no project would be implemented by the Federal Government to achieve the planning objectives. No Action, which is synonymous with the Without Project Condition, forms the basis from which all other alternative plans are measured. Under No Action the channel would be maintained at current depths, restricting some traffic and causing some traffic to travel to other ports better able to handle deeper draft vessels. Habitats such as the Bahia Grande would remain cut off from tidal inflow, greatly reducing use of the area by aquatic organisms, as well as causing public health issues due to wind blown dust. Beaches would also continue to decline slowly over time, possibly increasing the potential for storm damages.

(2) **Non-Structural measures.** Passage restrictions could be placed on the channel to restrict two-way traffic throughout the channel. This would increase safety in some situations but would not address depth restrictions currently found in the channel. There are no non-structural opportunities for restoration of habitat or shoreline erosion abatement.

(3) **Structural measures.** Widening and/or deepening of the channel could remove access restrictions on certain vessels currently utilizing Brazos Island Harbor. This would reduce delays and increase safety for those vessels. Modifications could be made to barriers to return flow to areas currently isolated from hydrology. Also, opportunities might be identified which include beneficial use of dredged material in the region. New cut deepening and widening projects tend to generate quantities of material that are suitable for beneficial uses. Placement opportunities also exist for sandy material on the beaches in and near the City of South Padre Island. This would reduce shoreline erosion and potentially reduce damages during hurricane and tropical storm events.

(4) **Separable features.** Separable features could include particular structural and non-structural measures which, when used together, would compliment each other in enhancing all three project objectives.

(5) **Preliminary Plans.** Preliminary plans are composed of one or more management measures that survived the initial screening. The descriptions and results of the evaluations of the preliminary plans that were considered in this study are present below:

(a) Preliminary Plans Eliminated from Further Consideration - None of the plans have been removed from consideration.

(b) Preliminary Plans for Further Consideration

Channel Modifications – Deepening and widening of the channel would enhance access to Brazos Island Harbor while also creating a safer channel. These alternatives would also generate materials that could potentially be utilized in a beneficial manner, including ecosystem restoration and storm damage reduction.

Ecosystem Restoration – There are several areas adjacent to the channel that have been impacted in the past by the cut off from tidal access. These areas are large, unvegetated areas that offer lower habitat value than if they had regular inundation by tides. The Bahia Grande is one example of an expansive sand flat that has no tidal access and reduced habitat value (Figure 2). Modifications to the channel could allow flows to return to these areas, generating significant benefits with little potential cost. This habitat creation/restoration is of such a priority that it has already been authorized as a project component by resolution in 2003, as detailed above.

There may also be opportunities to create habitat through the use of dredged materials in open waters to create depths suitable for submerged aquatic vegetation. When the depth is sufficient, this habitat is very common in the region and has a very high ecological value. These areas are utilized by many commercially important juvenile fish and shrimp species. Green sea turtles that feed exclusively on sea grasses and submerged vegetation also frequent them. There may also be an opportunity for the creation of bird islands utilizing dredged material. These structures offer predator free environments for birds to nest and roost on.

Storm Damage Reduction – Dredged material from the Brownsville Ship Channel is currently being utilized to reduce shoreline erosion on South Padre Island. Should a feasible deepening/widening project be identified, additional opportunities for storm damage/erosion reduction will be identified.

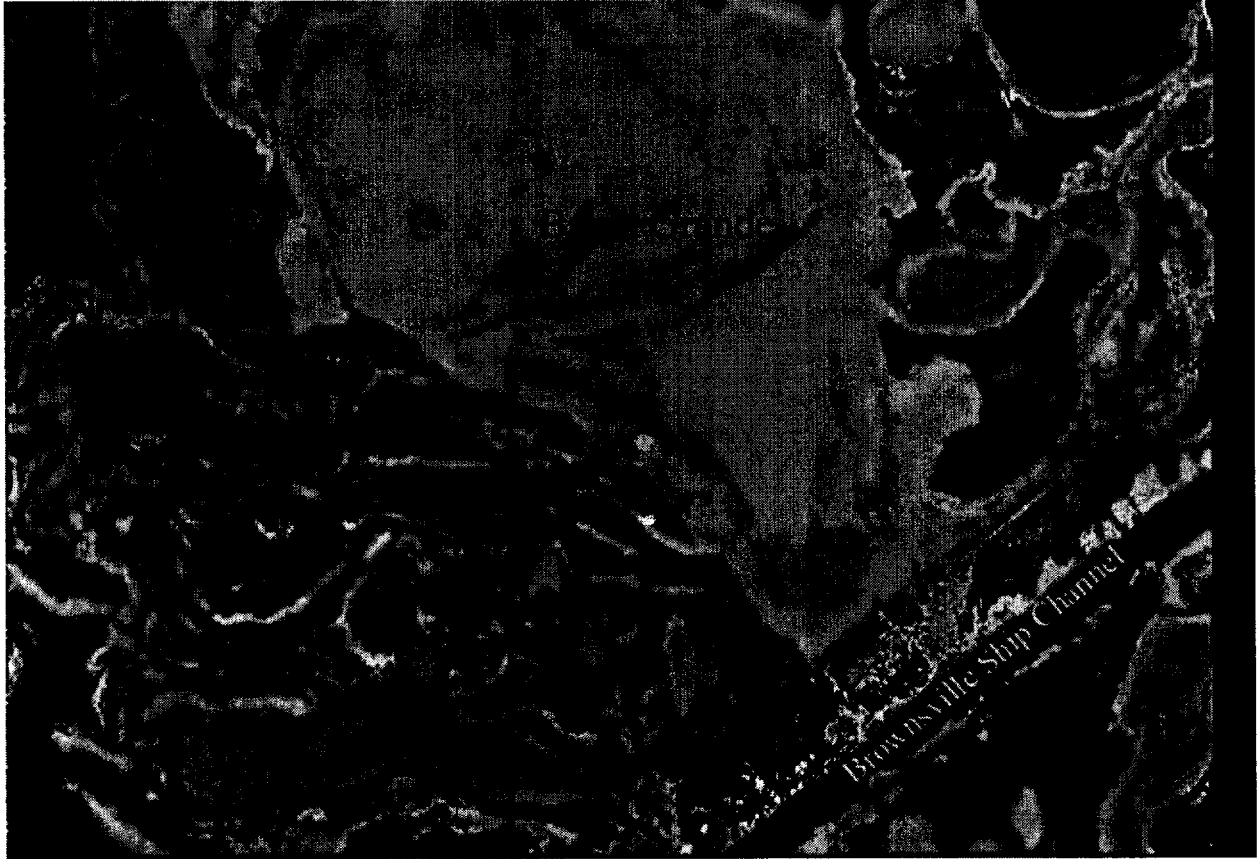


Figure 2  
Bahia Grande Sand Flat

**c. Preliminary evaluation of alternatives:**

Deepening and Widening of the Channel –

**Expected future conditions.**

**Import and Export Tonnage.** Detailed vessel routing data for 1998 and 2001 were reviewed in order to evaluate existing vessel utilization patterns. In 2001, approximately 10 percent of the ocean-going tonnage was transported in vessels with design drafts over 40 feet. The 1998 foreign import and export records showed that 12 percent of tonnage was transported in vessels with design drafts over 40 feet. The maximum design drafts for both years were in the 45- to 46-foot range.

The 1998 and 2001 data showed that the foreign origin and/or destination for the larger vessels were primarily associated with bulk cargo, such as rock, aggregate, and iron ore, transported from Mexico and, to a smaller extent, Brazil. The Mexico-Brownsville tonnage was imported through the recently renovated Port of Cozumel deep-draft dock. The Cozumel deep-draft dock, which is located across from Cozumel at Playa del Carmen, was recently dredged to an accommodating depth of 46 feet. In

addition, deep-draft cargo is shipped through the Brazilian port of Sepetiba. Sepetiba, which is part of the Rio de Janeiro port authority, has a depth of 49 feet at its bulk cargo pier and 48 feet at its container berth.

Table 3 displays the transportation savings benefits for Brownsville's existing bulk cargo base of rock, aggregate, and iron ore. For the period 1992-02, Brownsville's total foreign tonnage grew at an average annual rate of 3.2 percent. Consideration of the availability of channel depths of 45 feet or more, along with trade route limitations such as the Panama Canal maximum loaded draft of 39.6 feet, suggests that a maximum of 10 percent of import and export tonnage could benefit from channel depths of 45 feet through the year 2010. For future years, this percentage would likely increase and, for purposes of analysis, a maximum of 15 percent of tonnage was assumed to utilize depths between 45 and 55 feet. The port depths at world ports shipping and receiving dry bulk and container type traffic expected to move through Brownsville are likely to remain in the 45- to 50-foot range. Channel depth and cargo handling facilities associated with vessel drafts in excess of 50 feet are expected to continue to be primarily limited to crude petroleum for the near future.

**TABLE 3. Transportation Cost Benefits for Base Tonnage a/  
Annual Savings 2010-60**

Year	Total Tonnage (Existing Base) a/	Tonnage Used for Deep-Draft Benefit Calculations	Annual Savings 2010-60 by Channel Depth Based on 10% of Total Tonnage Base		
			45	50	55
2010	4,075,732	611,360	\$417,300	\$551,300	\$708,800
2020	5,280,853	792,128	\$540,700	\$714,300	\$918,400
2025	6,003,926	900,589	\$614,700	\$812,100	\$1,044,200
2060	14,824,207	2,223,631	\$1,517,900	\$2,005,300	\$2,578,200
Average Annual Benefits, 2010-60 @ 5.625%			\$690,300	\$912,000	\$1,172,600

a/ Application of existing base tonnage growing at an average annual rate of 3.2 percent.

Does not include potential container cargo.

The 2010-60 transportation benefits were calculated using an average annual growth rate of 3.2 percent. Analyses conducted for other Corps deep-draft channel projects have generally indicated a reasonable correlation between U. S. gross domestic product and tonnage growth. Global Insights Inc., a noted economic consulting and forecasting firm, is forecasting U. S. gross domestic products

growth between 2.0 to 4.0 percent over the period 2002-28. An average round trip mileage of 6,429 miles was used for the benefit calculation; this mileage is the average for Cozumel-Brownsville and Sepetiba-Brownsville.

**Offshore Rig Utilization.** Information provided through the non-Federal sponsor outlined the need for increased channel dimensions for the purpose of serving offshore rigs. The newer rigs, operating in the U. S. Gulf Coast and anticipated to serve Brownsville, range in depth from 45 to 63 feet. Documents provided by the non-Federal sponsor show that there are presently 11 oil companies that have acquired Outer Continental Shelf (OCS) blocks in the Central and Western Alaminos Canyon areas. The western region is relatively close to Brownsville. In addition to the one rig service company presently operating in Brownsville, other companies are interested in the Brownsville operating base due to its proximity to the Central and Western Alaminos Canyon areas. There is an interest in a consortium of rig repair services.

Transportation savings were evaluated based upon review of the geographic market area, which was delineated as Gulf waters from Brownsville, Texas to Galveston, Texas. Based upon the market area, the midpoint of the market area was estimated and the distance to the ports and the associated transportation cost savings were used to represent the difference between costs incurred traveling to Brownsville versus the next closest location.

At the present time, the ports of Corpus Christi and Freeport have channel depths of 45 feet. The Corpus Christi Channel is expected to be deepened to 52 feet by 2010. The feasibility level studies are presently being conducted for depths up to 60 feet for Freeport Harbor. Galveston has a channel depth of 40 feet and is expected to be dredged to 45 feet within the next few years. These competing ports do not have the width constraint that Brownsville has. An increase in channel width in Brownsville would help reduce transit times.

For purposes of analysis, transportation benefits were calculated using the mileage advantage that Brownsville has over alternative ports. Table 4 displays the mileage differences between Brownsville and competing sites. Also displayed are the benefits associated with the mileage savings that Brownsville provides. The benefits are based exclusively on the mileage savings that Brownsville affords over competing sites, and are not based on channel deepening. These benefits could be realized with a channel width increase of 50 to 75 feet.

During the recent historical past, the number of rigs serviced in Brownsville varied from 6 to 12 per year. At the present time, it takes between 8 and 12 hours to transport rigs from the entrance channel to the Brownsville docks. Under existing conditions, the rigs are transported at a speed of 2 to 4 mph. It was noted that a wider channel would likely lead to speeds of 5 to 6 mph. Widening

benefits were calculated based on this estimated speed increase that a wider channel would afford. Representatives of the offshore industry noted that widening of the Brownsville channel would also facilitate a 20 percent increase in rig service.

**TABLE 4. Brownsville Channel Mileage Savings**

Location	Round Trip Mileage from Gulf of Mexico Alaminos Canyon Drilling Zone	Brownsville One-Way Mileage Savings	Base Year Savings a/	Weight Factor used For Calculation
Brownsville, TX	326			
Corpus Christi, TX	366	40	\$14,500	60.0%
Freeport, TX	382	56	\$20,200	30.0%
Galveston, TX	408	82	\$29,600	10.0%
Weighted Savings Per Trip (Base Year)			\$17,700	100.0%

a/ Calculated a speed of 7 mph, a 40 to 82 mileage savings, and hourly ocean-tug cost of \$1,265. Calculated for round trip distance.

Table 5 summarizes the widening and mileage advantage benefits. The project benefits were calculated for a 50-year period of analysis at the FY04 Federal discount rate of 5.625 percent. An annual growth rate of 3.2 percent was used for the 2010-60 forecast period. The vessel operating costs used for the benefit calculations were estimated based on procedures outlined in the deep-draft and shallow-draft Economic Guidance Memorandums (EGM 06-02 and EGM 00-05). The sizes and number of vessels used to transport the rigs were identified using industry input. The widening benefits were based on a channel width increase of 50 to 75 feet

It was noted that in an emergency situation, vessels would need to spend approximately 5 days removing thrusters in order to gain access to ports along the U. S. Gulf Coast. In addition, when the rigs are being serviced, additional water depth is necessary and, moreover, access to a deeper access or common channels provides a cost advantage to the rig company as this associated access reduces the rig company cost. The water depth needed at the dock while working on the rigs is not a Federal responsibility; however, there would be a Federal interest in reducing the delays associated with removing the thrusters. It is also recognized that the thrusters are removed when rigs come into all other U. S. Gulf Coast ports but a channel depth of 55 feet would help to reduce delays for some rig traffic. Benefits were calculated based on the assumption that with a 55-foot channel, 50 percent of

rigs could eliminate the 5 day delay estimated by the rig company. For purposes of analysis, delays would be reduced for the ocean-going tugs and scuba-diver costs. Table 6 summarizes these deepening benefits.

**TABLE 5. Brownsville Offshore Rigs  
Channel Widening and Distance Savings Benefits 2002-60**

Year	Annual Number of Rigs Serviced		Miles Per Hour Savings a/	Distance Savings b/	Total Savings
	Without Channel Widening	With Channel Widening			
2002	12	14	\$32,200	\$247,900	\$280,000
2010	15	19	\$41,400	\$318,900	\$360,300
2030	29	35	\$77,800	\$598,700	\$676,500
2060	75	89	\$200,000	\$1,540,400	\$1,740,400
Average Annual Savings 2010-2060, 5.625%			\$75,500	\$581,000	\$656,400

a/ Calculated using the change from 2-to-4 mph for the without project to 5-to-6 mph widened project condition. Multiply speed change by number of rigs, apply for 8 miles, use 3 harbor tugs, and use an hourly operating cost of \$632.

b/ Use \$17,704 times 14 rigs.

**TABLE 6. Brownsville Channel 55-Foot Channel Deepening Benefits (5.625%)**

**Cost Inputs**

Ocean-Going Tug Hourly	\$1,265
Scuba-Diver Cost (hourly)	\$500
Total Hourly Cost	\$1,765

Year	Number of Rigs	Impacted Rigs	Annual Savings a/
2002	14	7	\$1,482,200
2010	18	9	\$1,907,000
2030	34	17	\$3,580,600
2060	87	44	\$9,211,800
Average Annual Savings 2002-60 @ 5.625%			\$3,474,400

a/ Calculated based on eliminating the cost of removing thrusters for 50 percent of rigs. It was noted to take 5 days to remove the thrusters.

**Container Cargo.** In spite of growing Texas Gulf Coast throughput, analyses conducted to date suggest that there are insufficient benefits at the present time to justify project construction cost for depths of 45 to 55 feet for container cargo. The basis for this general conclusion is extensive

analysis of Houston containership movements and U. S. container traffic needs conducted for Corpus Christi's La Quinta Channel. These analyses demonstrated that maximum channel depths of 40 to 42 feet are sufficient based on near future vessel fleet requirements and associated maximum loaded vessel drafts. Additionally, the only U. S. container port with channel depth of 50 feet or more is Los Angeles/Long Beach with a project depth of 53 feet. New York is currently 45 feet and is being dredged to 50 feet. The 50-foot New York Harbor depth may be the prevailing operational one by 2010. Channel depth justifications for these projects required clear demonstration that the existing fleet could readily utilize the increased channel depth.

It is likely that there will be a stronger basis for economic justification of channel depths over 42 feet for the U. S. Gulf Coast, in particular Brownsville, within the next 10 years and, therefore, it would be advantageous for the port to construct docks and pier pilings to depths up to 50 feet in order to be ready to revisit channel deepening at a future date.

**Economic Summary.** Table 7 summarizes the economic benefits. Table 8 presents the economic summary data, including the benefit-to-cost (B/C) ratios. The B/C ratio is above unity for a 45-foot project but below unity for a 55-foot proposal.

**TABLE 7. Brownsville Channel 55-Foot Channel Widening and Deepening Benefits (5.625%)**

Year	Widening Benefits	Deepening Benefits		
		45-ft	50-ft	55-ft
2002	280,048	\$417,300	\$551,300	\$2,191,100
2010	360,304	540,700	714,300	2,825,500
2030	676,493	614,800	812,100	4,624,800
2060	1,740,421	1,517,900	2,005,300	11,790,000
2010-60 AAE	656,428	\$690,300	\$912,000	\$4,646,900

**TABLE 8. Project Construction Cost and Economic Summary Data 2010-2060 Period of Analysis, 5.625 %**

Component	45-ft	55-ft
First Cost	\$17,737,000	\$100,078,000
Average Annual Cost	\$1,106,000	\$6,239,000
Average Annual Benefits	\$1,347,000	\$5,303,000
B/C Ratio	1.22	0.85



Ecosystem Restoration - There is a high potential for wetland creation and restoration in the region. Benefits include increased and enhanced habitat for several organisms, including endangered species, enhanced water quality, and enhanced aesthetics and tourism opportunities. Specific opportunities that exist include the return of tidal inundation to isolated sand flats, as well as the creation of submerged aquatic vegetation habitat and bird islands, both through the placement of dredged material. Additional studies and surveys of the proposed project area will be necessary before these alternatives can be evaluated.

Storm Damage Reduction - This alternative has already been shown to be successful through current practice. Additional modifications to the channel could afford opportunity to expand the area protected or offer more permanent protection to important areas. Additional studies and surveys of the proposed project area will be necessary before these alternatives can be evaluated.

## **6. FEDERAL INTEREST**

Based on the available information, navigation, ecosystem restoration, and shoreline erosion abatement measures are potentially economically feasible for at least some part of the study area. Since both navigation and ecosystem restoration are a high priority budget output and these are the primary outputs of the alternatives to be evaluated, there is a potential Federal interest in conducting the feasibility study. There is also a strong Federal interest in other related outputs of the alternatives including shoreline erosion protection.

## **7. PRELIMINARY FINANCIAL ANALYSIS**

As the non-Federal sponsor, the Port of Brownsville will be required to provide 50 percent of the cost of the feasibility phase. A letter of intent from the non-Federal sponsor stating their willingness and ability to pursue the feasibility study and to share in its cost, and an understanding of the cost sharing that is required for potential project construction, is included as Attachment 1.

## **8. SUMMARY OF FEASIBILITY STUDY ASSUMPTIONS AND EXCEPTIONS**

See Attachment 2

## 9. FEASIBILITY PHASE MILESTONES

Table 9 shows the milestones and duration of a feasibility study. A detailed study schedule will be developed in the Project Management Plan.

**Table 9. Feasibility Milestones**

<b>Milestone</b>	<b>Description</b>	<b>Duration (mo)</b>	<b>Cumulative (mo)</b>
F1	Initiate Study	0	0
F2	Public Workshop/Scoping	3	3
F3	Preliminary Alternatives Screening	8	11
F4	Independent Technical Review	1	12
F5	Feasibility Scoping Meeting and PGM	1	13
F6	Final Plan Formulation	8	21
F7	Design Analysis	8	29
F8	Independent Technical Review	1	30
F9	Alternative Formulation Briefing and PGM	1	31
F10	Draft Feasibility Report	4	35
F11	Final Public Meeting	1	36
F9	Independent Technical Review, Feasibility Review Conference, and PGM (if needed)	1	37
F10	Final Report to Division and Headquarters	2	39
F11	Division Commander's Public Notice	1	40
F12	Washington Level Review/Chief's Report	4	44

## 10. FEASIBILITY PHASE COST ESTIMATE

The preliminary cost for the feasibility study is estimated at \$5.2 million. Table 10 below presents a simple breakdown of the cost. A detailed cost estimate will be developed in the Project Management Plan.

**Table 10. Preliminary Feasibility Cost Schedule**

<b>Major Work Items</b>	<b>Study Cost</b>
Public Involvement	\$ 100,000
Economic Studies	\$ 400,000
Environmental Studies	\$ 700,000
Planning Services	\$ 500,000
Project Management	\$ 400,000
Engineering	\$ 1,450,000
Real Estate Studies	\$ 120,000
Model Studies	\$ 1,130,000

Independent Technical Review	\$ 50,000
GIS	\$ 50,000
Contingency	\$ 300,000
<b>Total Study Cost</b>	<b>\$ 5,200,000</b>
Federal	\$ 2,600,000
Non-Federal	\$ 2,600,000
In-Kind	\$
Cash	\$ 2,600,000

## 11. RECOMMENDATIONS

The recommendation resulting from the reconnaissance level investigation is that the Galveston District proceed with a cost-shared feasibility study with the Port of Brownsville as the lead cost-sharing sponsor. The preliminary cost estimate to perform the feasibility study is \$5.2 million and the duration is approximately 44 months. A refined cost estimate and schedule will be developed for the Project Management Plan.

## 12. POTENTIAL ISSUES AFFECTING INITIATION OF FEASIBILITY PHASE

a. Continuation of this study into the cost-shared phase is contingent upon an executed Feasibility Cost Sharing Agreement (FCSA). Failure to achieve an executed FCSA within 18 months of the beginning of the reconnaissance phase may result in termination of the study. There are no apparent issues at this time that will foreseeably impact the implementation of the feasibility phase.

b. The schedule for signing the FCSA is October 2004. Based on the schedule of milestones in Paragraph 9, completion of the feasibility report would be in October 2009, with a potential Congressional Authorization in the Water Resources Development Act of 2010.

## 13. VIEWS OF OTHER RESOURCE AGENCIES

Because of the funding and time constraints of the reconnaissance phase, limited informal meetings have been conducted with the resource agencies.

#### 14. PROJECT AREA MAP

A map of the study area is provided as Figure 1.

A handwritten signature in black ink, appearing to read "Steve Haustein", with a stylized flourish at the end.

STEVEN P. HAUSTEIN  
COL, EN  
Commanding

February 24, 2004

**PORT OF**  
**BROWNSVILLE**  
HOME PORT TO NAFTA

Leonard D. Waterworth  
Colonel, Corps of Engineers  
District Engineer  
2000 Fort Point Road  
Galveston, Texas 77550

RE: Brazos Island Harbor

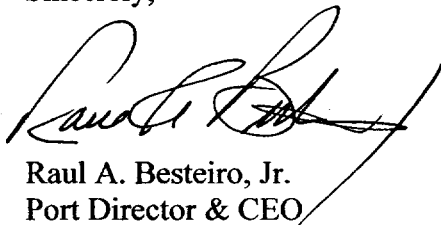
Dear Colonel Waterworth:

The Brownsville Navigation District is formally requesting that the Galveston District Corps of Engineers complete a 905(b) study for deepening of the Brazos Island Harbor, Brownsville Ship Channel, Texas, to determine a Federal interest in this project.

If the 905(b) study report indicates a Federal interest, the Brownsville Navigation District is expressing in this letter the intent of the Navigation District to enter into negotiations for the feasibility phase of the channel deepening project. The Project Management Plan developed during the negotiations will describe the study activities, proposed schedule, and cost of the study. I understand that the cost-sharing responsibility during the feasibility study is 50 percent, and up to half of that can be provided in in-kind services. In addition, the Brownsville Navigation District intends to work with State and Federal agencies as well as Local funding to the fullest extent possible. I understand this letter is not a contractual obligation on the part of the Brownsville Navigation District. Any such obligations would have to be approved by our Board of Commissioners. However, because of the strong and consistent support that our Board has shown for this project, I do not believe that obtaining that approval at the appropriate time will be a problem.

Please let me know if you have any questions or comments regarding the above mentioned.

Sincerely,



Raul A. Besteiro, Jr.  
Port Director & CEO

cc: Don Blanton

*17 Mar*  
*DEY*  
*PELS*  
*Port J. H. M.*  
*Carl*

## **Feasibility Study Assumptions**

1. Alternatives will be fully addressed under the Endangered Species Act and coordinated with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and other appropriate agencies.
2. The study will cover the requirements of the Texas Coastal Management Plan to insure that any alternative selected is consistent with that plan.
3. The study would cover the requirements of the Clean Water Act, as amended. A NEPA document would be prepared as appropriate to address any proposed action to comply with NEPA and other requirements.
4. Appropriate cultural resource investigations will be conducted within the study area to ensure historic areas are not adversely affected by proposed project plans.
5. Additional HTRW surveys will be conducted to update existing data and to assess areas of interest not previously studied.
6. Studied plan(s) should consider maintaining the recreational value of the study areas.
7. Due to the size of the study area and the limited scope of this report, it is impractical to develop a total project cost based on the proposed alternatives. Consideration must also be given that it is possible that not all of the project area in this study will need or justify a project.
8. A detailed cost estimate will be prepared for the selected plan(s), providing an analysis suitable for a feasibility level study.
9. Incremental analyses will be performed by the Corps on ecosystem restoration alternatives in order to display costs vs. ecological outputs (benefits).